DATA PROCESSING DIGEST

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General Information

INDUSTRIAL DYNAMICS—A MAJOR BREAKTHROUGH FOR DECISION MAKERS

Jay W. Forrester, M.I.T., Cambridge, Massachusetts
HARVARD BUSINESS REVIEW, July-August, 1958; pages 37-66.

"Management is on the verge of a major breakthrough in understanding how industrial company success depends on the interaction between the flows of information, materials, money, manpower, and capital equipment."

"The new management concepts will rest in part on recent advances in data-processing...improved understanding of decision making and experience in analyzing and simulating the characteristics of complex systems, and...on 20 years of research in information-feedback systems."

Regarding electronic data processing, however, "it is no more the focal point of the future management profession than a slide rule is the essence of engineering." In the area of decision making, "it has been amply demonstrated that carefully selected formal rules can lead to tactical decisions that excel those made by human judgment under the pressure of time and with insufficient experience and practice," and that men "are just as adaptable to the more abstract strategic planning as they are to tactical decision making...."

The technique of simulation, in business, means setting up in a digital computer the conditions which describe company operations. The study of feedback systems is concerned with the way information is used for control, and "helps us to understand how the amount of corrective action and the time delays in interconnected systems can lead to unstable fluctuation." Feedback theory also "explains how decisions, delays, and predictions can produce either good control or dramatically unstable operation. It relates sales promotion to production swings, purchasing and pricing policies to inventory fluctuations, and typical life cycles of products to the need for research."

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Study of feedback helps us understand fluctuations in business systems

A simplified example problem is given, in which only the flows of information and materials are considered. Capital equipment, manpower and money were not included. The problem discussion demonstrates what happens to the system when a small sudden increase in retail sales takes place. Three kinds of information are needed about the system in order to study it: the organizational structure, the delays in decisions and actions, and the policies governing purchases and inventories. Each of these must be expressed in quantitative form. Digital computer simulation was used to get the results.

Getting the data for simulating company behavior may often be difficult. When the exact value of an operating characteristic is not available, the system may be tested with a range of possible values. Then, if it is found that the system is highly sensitive to some factor, additional effort can be put into determining the correct value. At least, the risks of not knowing it become apparent.

"Industrial dynamics is in an early stage of development.... It is likely that the next five years will be devoted to exploratory research, development of basic analytical techniques, handling of enough specific industrial situations to demonstrate success, and establishment of new academic programs, for training future managers. After this period there will come general recognition of the advantage enjoyed by the pioneering managements.... The company will come to be recognized not as a collection of separate functions but as a system in which the flows of information, materials, manpower, capital equipment, and money set up forces that determine the basic tendencies toward growth, fluctuation, and decline."

Although more companies fail from poor management than from poor engineering, companies which include research on the management process as a part of their long range planning are still the exception.

Industrial dynamics is fertile field for research

There are six high-priority areas for research:

1. Money flow--how the financial position of the company and its profitability depend on operating decisions.

2. Consumer market and advertising--a single unified market model to cover the entire life cycle of a product.

3. Capital investment.

4. Research and development--relation of research to profit.

5. Economic conditions--we should not trust our intuitive estimate of what a development here or a change there implies for the behavior of the economic system as a whole.

6. Case studies--as methods are developed, they must be tested in real situations.

"The executive of the future will be concerned not so much with actual operating decisions as with the basis for wise operating decisions.... We can expect changes in various management responsibilities. There will be a merging of many line-and-staff functions. ... Therefore, systems planning must, in time, be the tool of the responsible manager." Ultimately, increased understanding of the company operation will permit managers at the lower levels to take on more operating responsibility.

SYSTEMS AND PROCEDURES FOR THE ELECTRONIC AGE

P. E. Priest, Thompson Products Inc., Cleveland, Ohio
N.A.A. BULLETIN CONFERENCE PROCEEDINGS, August 1958, pages 47-55.

All business plans and reports from one set of figures

"Planning for electronic data processing should be approached on the basis of business systems rather than business applications.... Define the corporate planning, performance and bookkeeping reports required for proper control of your business. Plan to base all three on one set of numbers so that sales, production control, manufacturing, manpower and facilities planning, budgetary control, accounting and financial planning are all working to targets developed from a sales and forecast sales expressed in product quantity by representative part numbers. Measure each responsibility to the targets developed."

Such plans may need information not now available, but which may be obtained through the use of a computer. However, the use of a computer must not be expected to increase profit margins by huge savings in clerical costs alone. Rather, the money invested in the computing system will improve "the control of dollars you spend for inventory, excess facilities or to increase your volume by becoming more competitive through better service, lower costs, fewer lost sales."

Systems planning should be undertaken by a systems analysis team, headed by a thoroughly trained business systems specialist, and including the following persons from the business organization: an industrial engineer, a production control specialist, an accountant well versed in manufacturing costs, a data processing technician and programer. Other talents may be brought in on a part-time basis. These men should then be trained as business system analysts in three areas: 1. the concept of the corporate program for integration of data, 2. establishing of the tasks required to implement the program, and 3. school-room training in data processing equipment.

When the team begins its actual work, they should begin with the two most vital pieces of paper in a manufacturing organiza-

Begin with parts list and manufacturing routing

tion--a parts list and a manufacturing routing. It may require a year and a half to properly set up these two files. "An examination of parts list and routing content will immediately establish the possible need for engineered standards and adequate coding. Without these, any planning report might only be a fine training program for computer programers. Coding might be considered a part of engineered standards. Certainly coding should be initiated and controlled by corporate staff, for it is the language that all reporting areas will use to communicate between themselves and with the corporate head."

Coding is necessary in three working areas--personnel and organization of plant or works division (department building, bay, office, employee, labor codes, vendor and customer numbers); inventories; expenditure authorization and accumulation numbers.

"All of these should be properly associated to account numbers for bookkeeping entries....Avoid coding codes. Avoid over-emphasis on mnemonic numbering systems which break down much sooner than a simple prefix number which indentifies the kind of number it is, followed by a number that is serial in form. Above all, make sure the number is unique, meaning only one person, place, thing or address."

Control techniques must be included in the system to assure receipt of all documents, and accurate transmission of data. "Since modern business systems can be designed for both centralized and decentralized organizations and, in either case, must consider the lateral flow of data between business functions, the establishment of data control centers seems to be the answer. It will be their function to schedule and control both the input of standard and application data to your computer center as well as to control and distribute the output reports and documents produced by data processing methods."

BUSINESS ELECTRONICS REFERENCE GUIDE

Controllership Foundation, 1958. $15.

Volume 4 of the Controllers Foundation Business Electronics Reference Guide has been published. This is an indispensable item for the library of a management man interested or involved in EDP. The size of the 1958 volume tells the story of the development of EDP in the past year. There are more than twice as many pages, more than four times as many computer installations listed.

The guide includes listings of computer centers, training programs, conferences and seminars, films, articles from periodicals, reports and proceedings, books, and subscription services. There are resumes of individual company installations, followed by

an index of companies by computer applications. Complete physical descriptions of the computing systems available for purchase or rental are given.

There is one serious omission which we hope will be remedied in future editions. Nowhere could we find a statement that the list of books is limited to those published since the issue of Volume 3 of the Reference Guide. This we discovered only after writing to the publisher to inquire about the absence of several of the "classics" in EDP literature. We believe that such a complete and excellent guide should include at least a selection of the best literature published in the field, and not merely those published during the past eighteen months.

COMPUTERS AND COMMERCE: I

A. S. Douglas, University of Leeds, England
THE COMPUTER JOURNAL, July 1958; pages 69, 70.

Scientific computing methods are basic

As a preliminary to discussing the use of computers in three areas of business activity (Accounting, statistics and sales analyses; Stock recording and control; Production and movement control), the author discusses their use in scientific and engineering problems, "in the belief that there is something of fundamental value to all users to be gained by a study of these methods."

"The procedure for solving any given scientific problem[is] briefly...(a) define the problem qualitatively, (b) reduce the problem to mathematical notation, (c) select the numerical method of solution, carrying out any necessary mathematical manipulation; and (d) draw up the computer program, including (i) the specification of techniques for enumeration where necessary, (ii) the internal organization of the storage, input and output, and (iii) the external organization of data preparation and the subsequent handling of results.

"It is important to appreciate that these stages are strongly interdependent.

"It would appear that the steps required in the solution of commercial problems would not differ greatly from these, although formal mathematical notation might not be involved. This analysis, therefore, leads me to draw my first moral from scientific experience. It is that efficient programming for a computer can be done only by someone who understands both the fundamental operation of the commercial system into which the computer work is to be fitted and also the techniques used in programming the chosen computer. This leads me to advocate strongly a 'vertical' division of labor among programmers--one man to one job....However, the closest attention must be paid to the co-ordination of the work as a whole."

The second moral is that "all methods in previous use for punched-card or hand systems should be treated with suspicion when examining a job to see if it is suitable for a computer. It is of great importance that a fundamental approach to the problem should be, at the least, considered...."

Business autocodes should be in English

Several programing concepts which are widely used in scien- work are being over-emphasized in commercial work. One of these is the autocode, which assumes that "all scientific users comprehend mathematical notation, and would be willing to accept a few restrictions on the use of it....In the commercial field such an assumption is obviously invalid and, furthermore, most of the work required involves not so much mathematical as logical operations, the appropriate language for which is not widely known.

It follows that any business autocode would most suitably translate plain English....If English words are not to be used, it is probable that any alternative code will be at least as difficult to learn as direct machine code....For practical purposes [commercial automatic codes] may be ignored or, at least, left to the universities and manufacturers to develop."

"Concluding our study of scientific applications, we may classify the types of work carried out into four main categories. These are (1) mechanization of existing hand or punched-card applications; (2) mechanization of work known to be susceptible to ordinary numerical attack, but not carried out previously due to the prohibitive time or cost likely to be involved; (3) use of trial and error techniques....Many of the most profitable scientific applications of computers have largely been under (3) and (4), and we may expect that these will play a great part in an industrial context in the future."

NAVY'S "EDP" PRINCIPLES AND OBJECTIVES

NAVY MANAGEMENT REVIEW, July 1958; page 11.

Continuing the review of EDP objectives ((see DPD: June 1958, page 2 and August 1958, page 7)), this installment speaks of Systems Planning. Four criteria are given as general guidelines for effective systems planning. They are:

1. Applicability of EDP equipment should be evaluated on the basis of over-all requirements rather than individual jobs or segments of a job.

2. Source data automation techniques should be fully explored.

3. Consider standardization and integration of related applicational areas.

4. Plan for maximum computational processes.

CHOOSING YOUR COMPUTER—I, II

THE ACCOUNTANT, June 14 and 21, 1958.

Part I discusses the storage requirements of computer systems, including valve (tube), magnetic core, and delay line for the fast access storage, random access and magnetic tape.

Part II covers the programing and operating facilities. It is suggested that attention be given to the size of storage requirements, provision of intermediate storage and automatic checking circuits, and whether binary or decimal notation is preferred. Such peripheral equipment as punch card or paper tape input, high-speed printers, and character recognition equipment, are considered. Conclusions one reaches from the article are that the prospective customer has very little factual information to go on in making a wise choice, and that his safest course might be to select the oldest company with the most machines in use.

CENTRALIZED INFORMATION SERVICES

Allen Kent and James W. Perry, Western Reserve University
Interscience Publishers, New York. 1958. $5.00.

Increasing awareness of the vast problem of information retrieval is causing some persons to urge that a centralized information service be established. This report tells of some of these efforts, and suggests that "considerable effort should be directed to preparing detailed descriptions and models of centralized and cooperative information processing activities at various levels." Results of some surveys of how companies search for technical information are included.

THE COMPUTER DIRECTORY AND BUYERS' GUIDE, 1958

COMPUTERS AND AUTOMATION, June 1958.

The entire issue is given to a directory of manufacturers and services in the computing field. This is an annual service.

ACCOUNTING BY ELECTRONIC METHODS—AN INTRODUCTORY OUTLINE

THE ACCOUNTANT, July 12, 1958; pages 40-48.

The Council of The Institute of Chartered Accountants in England and Wales has published an outline of information on the nature of electronic equipment and its application to business uses. The information is elementary, and a very good introduction for those new to the field of EDP.

COMPUTERS FOR THE SMALL CONSULTING FIRM

Edward G. Brender and Thomas A. Weyand, Brender and Brender Inc.
CONSULTING ENGINEER, August 1958; pages 88-90.

This civil engineering firm of only 10 persons has found it is not too small to use an LGP-30 to advantage. The firm estimates the cost of the installation, including programing training, was about equivalent to two engineers, while it does the work of four or five. One advantage of the small computer is the economy of space, since the entire installation occupies a space of only 81 square feet.

THE EXTENT OF AUTOMATION IN COMMERCIAL BOOKKEEPING

Forde Steele, Central National Bank, Cleveland
BANKING, August 1958; pages 45, 46, 108.

Seventeen steps are given for a fully automated system of processing "us" checks received by a typical bank from the clearing house or in the Federal Reserve letter. From the system described, the reader can see that "so-called fully automatic bookkeeping systems neither eliminate manual operations entirely nor are they simple. However, if volume is large enough, complete automation of checking accounts will save money for the bank which installs such a system. At present prices, it would seem that a bank should have daily activity of 15,000, possibly 20,000 items to justify a fully automated system with semi-automatic machines. Fifty thousand items per day or more may be required to justify on a cost basis a fully automated system utilizing a computer."

ELECTRONIC DATA PROCESSING'S SECOND DECADE

W. K. Drake, Control Data Corporation, Minneapolis, Minn.
SYSTEMS AND PROCEDURES, August 1958; pages 31-34.

Some predictions for the next ten years:

More transistorized computers, one-tenth the size of present ones, operating two to four times faster, costing less, and because of all these features, being purchased rather than leased.

Automatic coding and programing techniques and mass-storage methods will become more practical. Character-reading input equipment will be in common use, document-handling equipment will be available, printers will be quieter and faster. Some machines will incorporate micro-programing. Magnetic core memories will be larger and faster. Some may take the form of deposited magnetic material and multilayer printed circuitry. Reliability will be taken for granted and maintenance will be on the basis of periodic checkup.

Management Decision-making Techniques

TRENDS IN OPERATIONAL RESEARCH

Ronald W. Bevan, Air Ministry, England
OPERATIONS RESEARCH, May-June, 1958; pages 441-446.

The author draws some important conclusions from the experience of operations research's brief history:

1. We are not yet agreed on how to define our subject.

2. In some respect there has been a decline in the quality of OR in the United Kingdom since the war.

3. Insufficient attention is paid to providing for the future of OR.

OR is a science but without a body of scientific theory

While OR is properly defined as a science, "there is some way to go before operational research can be regarded as a science. One of the main impediments...is our failure so far to build up a reasonable body of information or theory on criteria, standards, values, call them what you will....A further impediment...is our failure so far to develop experimental or laboratory techniques that are an essential component of any science....In the main, observation and collection of data have had to be made without interfering with the running of organizations. The opportunities for controlled experimentation are thus limited."

Work being done at the Rand Corporation (Los Angeles) indicates that electronic computing and data storage equipment presents "possibilities for introducing experimental techniques into operational research."

The author found that in the United States operations research has "evolved more truly from the original conception...." and that there is beginning to develop both academic operations research and applied operations research, as evidenced by the number of university courses in OR, training for OR workers, and the Rand Corporation "which might well be regarded as an operations-research university."

A COMPREHENSIVE BIBLIOGRAPHY ON OPERATIONS RESEARCH

John Wiley & Sons, 1958. $6.50.

This bibliography contains approximately 3000 titles of articles, books, proceedings, etc. which had been published through December 1956. A supplement at the rear of the book gives those published in 1957. A cross file by subject matter, giving the author's name as an indicator, is included. For those concerned with operations research, this is an essential library reference.

Applications

VENTURA COUNTY, CALIFORNIA, EDP INSTALLATION

Ventura County will install next June, an IBM 305 RAMAC for processing tax accounting, general budget work, cost and payroll accounting, and welfare payements. In addition, it is planned to use the computer for complex engineering calculations for the Department of Public Works and for checking survey data for both Public Works and the Assessor's office. The computer will be rented.

MIDDLE EAST GETS COMPUTER

ELECTRONICS, July 25, 1958; page 34.

The Arabian American Oil Company will use an electronic computing system to maintain records of supplies. Punch cards for each item are being prepared in New York, and will then be flown to Saudi Arabia for transfer to magnetic tape. The records will contain physical description, source or manufacturer, cost, means of shipment to Saudi Arabia, present location, quantity in inventory, rate of consumption, anticipated reordering date and other data.

ELECTRONIC POSTING IN A 1600-ACCOUNT BANK

BANKING, August 1958; page 43.

"Any bank with 1600 or more accounts which handles a daily average of 900 checks and deposits and has 600 balance moves a day can profitably install an electronic posting machine, says Paul A. Schroedel, Cashier, The State Bank of Parsons, Kansas."

Mr. Schroedel suggests the following: Keep your coding simple; start your customer education early and keep at it constantly; display the machine in your lobby.

FIRST NATIONAL BANK OF BOSTON

An electronic system designed by Datamatic has been installed at the First National Bank of Boston. At present, 30,000 special checking accounts are being run; later, with the addition of equipment now being developed, 70,000 regular checking accounts

will be added. The new equipment will include ability to read check information printed in magnetic ink. Other applications planned for the system include the maintenance of Stockholders' Ledgers, preparation of dividend checks for the Trust division, and loan accounting. Personal trust accounting and payroll accounting applications are under study.

EQUIPMENT TRUST DATA PROCESSING

Harry E. Mertz, LaSalle National Bank, Chicago
BANKING, August 1958; pages 42, 114.

The LaSalle National Bank has placed its equipment trust automobile fleet-leasing operations on a service bureau computer 10 miles from the bank. Although the bank cautiously placed its files on punch cards originally (in the event the system did not work out and it would be converted to conventional tab operation), they are now seriously considering transferring the files to tape. They have found the advantage of using the service bureau is that they "have not made any large equipment investment and neither have we been faced with the problem of obtaining highly-skilled personnel to program and operate our own installation. Also, at this time it has not been definitely decided what type of computer would best fit our purposes."

Equipment

PUNCH CARDS CONTROL THEIR SELECTIVE CONVEYOR

BUSINESS, July 1958; pages 56-58.

The Lotus Shoe Company in Stafford, England, discovered that it was wasting time getting batches of shoe uppers to workers when the shoe design was not appropriate for a continuous assembly line operation. A system was devised, using an overhead conveyor equipped with punch-card sensing mechanism. The daily production schedule is prepared according to the designs to be processed and the work is broken down into batches of one dozen pairs. Then punch cards are prepared for each operation in each batch. The leading edge of each card has an Autoroute code. The cards for the batch are loaded into a small case which is then inserted into a metal canister on which the bag containing the batch is hung. The top punch card is pushed forward into sensing position, and the canister is hung on the conveyor. The canister pauses at each work station and the Autoroute code is read. When it reaches the proper

work station, a release mechanism drops the bag and the canister into the work area. When the worker has finished the batch, she removes the punch card, retaining it for her work record, and pushes the next card in the canister into the sensing position; then she sends the batch on its way to the next work station. The cards retained by each worker are then used (theoretically at present) for production statistics, payroll, costings, and bonus calculations.

NEW ADVANCE IN BANK PROOF OPERATIONS

BURROUGHS CLEARING HOUSE, August 1958; pages 25, 26.

The National Bank of Detroit has begun operation of a three-piece proof machine designed by Burroughs Corporation. The three basic pieces are: "a master control unit from which the operator issues orders; a 27-pocket device for sorting and endorsing checks; and a 27-tape listing machine for recording check and deposit amounts and totals."

"The operator controls all three units from her master keyboard. She simply lists the credit amount and then the checks. The machine automatically subtracts the checks from the credit amount and sorts and distributes them to their proper classification.... The proof equipment produces a complete master tape record of all the items processed by the operator....Each tape shows the classification number, transit number and machine number."

COMPUTER DETECTS AND CORRECTS ERRORS

AUTOMATIC CONTROL, July 1958; pages 46, 47.

Datamatic has developed an automatic control feature for the Datamatic 1000-B, called "Orthotronic," which automatically reconstructs garbled or lost information within the computer system. The control is an integral part of the computer system, and consists of a special control channel on the Datamatic tape, a checking circuitry, and a special control code for the use of the programer.

Datamatic tapes are divided into blocks consisting of 62 words each. Each word is composed of 52 binary digits. The four bit positions on the extreme right of each word are used as a weight count digit. Each of the remaining 48 information bits has a number 1, 2, 4 or 8, which is the weight for the bit position. The weight count for the word is automatically computed and recorded in the weight count digit space. "Whenever a Datamatic word is transferred from the input buffer to memory, the weight count is recomputed and checked against the original. If an incorrect count is detected indicating that the word is incorrect, the Datamatic 1000 utilizes Orthotronic Control to regenerate the original information."

This is done through an automatic transfer of control to a specific memory register. This register stores an instruction to go to a subroutine, devised by the programer, which uses the Orthochannel to correct the error. "Before initiating the Orthocorrection procedure, the subroutine may, as one of many alternatives, cause the entire block of data to be re-read from tape into the buffer. A new Orthomonitor Transfer-in instruction, one which includes the transfer of the Orthotronic Monitor Channel, is then used to bring into memory the entire block. When all 64 words have been entered into memory, a special Orthotronic Add instruction, which has been included in the Datamatic repertoire of instructions, then enables the machine to regenerate the original data."

ELECTRONIC MACHINES THAT HANDLE BRITISH MAIL

THE OFFICE, June 1958; pages 72, 73, 100-104.

The British Post Office is using the first automatic letter facing machine, designed by the Post Office, Harrison & Sons Ltd. (stamp printers), and Acheson Colloids Ltd. (chemical company).

The reading medium is graphite ink, printed in strips on the back of stamp paper, under the adhesive. A scanner searches for the presence of the stamp in the proper location in the batched mail, rejecting letters which are not properly faced, and causing these letters to be turned 180 degrees before rejoining the properly faced letter stream. The second set of scanners then locates the stamp on the leading or trailing edge ((apparently a British device for distinguishing between types of mail)) and distinguishes between high and low mail rates (according to the magnetic pattern of the ink strips). The letters are thus segregated into four stacks, with a fifth stack for mail bearing no stamps.

The system also includes a letter sorting indicator, in which an operator views each letter address through a viewing window, and operates coding keys to divert the letter to the proper mail chute.

CODED MAIL SORTING

ELECTRICAL ENGINEERING, August 1958; pages 730, 731.

Pictures and descriptions are given of the various pieces of equipment being designed for the U.S. Post Office Department by the Rabinow Engineering Company under the direction of the National Bureau of Standards. The coders and sorters are being designed as modular units for adaptability to the varying sorting complexities and space requirements of different post offices.

Comment

ON FINDING THE RIGHT PLACE BY NUMBERS

Post Office Departments in England, the U.S. (see page 13) and some other countries are working toward automatic mail handling. But they will still require a human being to decipher and interpret long and involved addresses as well as to remember or look up and then assign the thousands of codes required to send letters down the right chute.

A numerical locating system could speed mail coding and count electric poles

The fly in the ointment here, as well as in many another locating job (such as package delivery, and finding the friend who moved to the suburbs), is the haphazard method we have of describing some geographical pinpoint. Imagine the problem encountered by a utility company systems engineer who must locate thousands of electric poles in a rural area for a magnetic tape file. How do you condense "the third pole west of the driveway leading to the Smith farm" to a six-digit computer word? And isn't there a better way to send a letter through the postal system than to look up the seldom-used code for R. R. 16, Smalltown, Tennessee, then type it on the envelope from a magnetic-ink printing machine?

A universal addressing system in coded numerical form would answer a multitude of such problems.

Fortunately, there is such a system waiting for official and popular acceptance. It is the East-North Location System devised by Ambrose P. Ryder of Carmel, New York, and described in his booklet "Where is Where?" It is based, very simply, on the already world-wide standard measurements of longitude and latitude. Mr. Ryder's system divides these measurements into centimins (1/100 of a minute), bringing the basic measurement down to about 50 ft. Any point on the globe may be measured East of the International Date Line and North of the South Pole in a series of digits which may be as detailed as necessary to locate the desired point. If a point must be located more accurately than within 50 ft., the location number is simply extended beyond the decimal point.

Now imagine those electric poles located graphically on a map and numerically in the tape file as (for example) 356E-427N, 348E-427N, etc. Or perhaps your postage meter has been fitted with a magnetic ink imprinter to code your outgoing mail with EN numbers. Would the Post Office find it worth giving you an attractive postage rate if it could automatically read your coded addresses quickly and accurately?

A simple redundancy code could be added

A good code should include a redundancy check, which is lacking in the present E-N system. But this is not an insurmountable problem, and can be solved with a reasonable amount of systems study.

The uses of EN numbers go beyond the possible applications in automatic character reading or data processing. For example, a person phoning in the EN address of an emergency spot will help the police and fire departments get there more quickly. Foreign locations would need no translating service, since the initials EN and the series of digits associated with them would be sufficient. And that friend who moved to the suburbs, even if he is hidden among a thousand identical cottages on winding roads, can be found before the weekend is over.

Mr. Ryder's booklet, "Where is Where?" may be purchased for $1. Write to Ambrose P. Ryder, Box 384, Carmel, New York. (Also see "East-North: A Universal Address Coding System," The Office, June 1958; pages 65-71.)

Training

Installing Electronic Data Processing Systems
Date: October 13-17, 1958
Place: New York (Hotel Roosevelt)
Fee: $250
Information: Canning, Sisson and Associates, 1140 South Robertson Blvd., Los Angeles 35, California

How to Use Electronic Data Processing for Production Planning and Inventory Control
Date: October 20-24, 1958
Place: Chicago, Illinois (The Chicago Club)
Fee: $385
Information: Management Science Training Institute, 40 Wall Street, New York 5, New York

Management Concepts in Operations Research
Date: October 27-31, 1958
Place: Boston, Massachusetts (The Harvard Club)
Information: Harvey N. Shycon Company, Park Square Building, Boston, Massachusetts

COLLEGE COURSES

Harvard University, Cambridge, Massachusetts
Courses in Operations Research and Automatic Data Processing leading to A.M. and Ph.D. School year, 1958-59. For information, write to: Assistant Professor Iverson, Computation Laboratory, Harvard University, Cambridge 38, Massachusetts.

Pennsylvania State University, University Park, Pennsylvania
Courses in programing for engineering, scientific and business applications. School year 1958-59. For information, write to Registrar, Pennsylvania State University, University Park, Pennsylvania.

New York University, New York City--The Management Institute Courses and related seminars in electronic data processing systems for business and industry, leading to a Certificate in Electronic Data Processing. Courses are aimed at business people who are already engaged in the preparation of computer installations. Fall term, 1958. For information, write to Registrar, Division of General Education, New York University, 1 Washington Square North, New York 3, New York.

San Diego State College, San Diego, California
Electronic Data Processing, as related to management decision-making, an elective course in the Division of Business Administration. School year, 1958-59. For information, write to Registrar, San Diego State College, San Diego, California.

University of California, Berkeley, California

Extension courses:	Electronic Data Processing: Programming a Business Computer (833) Engineering Applications of Digital Computing Machines: Numerical Methods (850AB) Programing for Scientific Calculation (834AB) Introduction to Operations Research (XB 193A)
Location of courses:	Various
Information:	Extension Division, University of California, Berkeley, California

Meetings

International Systems Meeting, Systems and Procedures Association
Date: October 13-15, 1958
Place: Pittsburgh, Pennsylvania (Hotel Penn-Sheraton)
Information: Mr. A. M. Motter, Jones & Laughlin Steel Corp., #3 Gateway Center, Pittsburgh 30, Pennsylvania

The Institute of Management Sciences Annual Meeting
Date: October 16-18, 1958 (Sheraton Hotel)
Place: Philadelphia, Pennsylvania
Information: Ezra Glaser, National Analysts, Inc., 1015 Chestnut Street, Philadelphia 7, Pennsylvania

Operations Research Society of America National Meeting
Date: October 23, 24, 1958
Place: St. Louis, Missouri (Statler Hotel)

Fifth Annual Computer Applications Symposium, Armour Research Foundation
Date: October 29, 30, 1958
Place: Chicago, Illinois
Information: Armour Research Foundation, 10 West 35th Street, Chicago 16, Illinois

Fourth Electronic Business Systems Conference, sponsored by Western Division of NMAA
Date: October 30, 31, 1958
Place: Seattle, Washington (Olympic Hotel)
Information: E.B.S. Conference, National Machine Accountants Assoc., Western Division, P.O. Box 134, Seattle 11, Washington

International Conference on Scientific Information
Date: November 16-21, 1958
Place: Washington, D. C. (Mayflower Hotel)
Information: Secretariate, International Conference on Scientific Information, National Academy of Sciences, 2101 Constitution Avenue, N.W., Washington 25, D. C.

National Physical Laboratory Symposium and Electronic Computer Exhibition
Date: November 28-December 4, 1958
Place: London, England
Information: C. V. Wattenbach, Deputy Managing Director, Dictograph Telephones, Ltd., London England

Eastern Joint Computer Conference
Date: December 1958
Place: Philadelphia, Pennsylvania (Bellevue Stratford Hotel)

Western Joint Computer Conference

Date: March 3-5, 1959
Place: San Francisco, California (Fairmont Hotel)
Theme: "New Horizons with Computer Technology"
Information: WJCC, Box 381, Station A, Palo Alto, California

International Conference on Information Processing

Date: June 13-21, 1959
Place: Paris or Rome (decision later)
Information: U.S. Committee for the First International Conference on Information Processing, Box 4999, Washington 8, D. C.

1955 ACM National Conference

Date: Summer, 1959
Place: M.I.T.
Information: F. Verzuh, Massachusetts Institute of Technology, Cambridge, Mass.

SHARED PROGRAMING GROUP

UNIVAC Users Conference - Oct. 20-21, 1958, Boston, Mass. For information write: R. M. Petersen, General Electric Company, Appliance Park, AP 1-109, Louisville, Kentucky.

References

The publishers of books and periodicals mentioned in this issue of DATA PROCESSING DIGEST are listed below for your convenience in writing for more complete information.

The Accountant
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Throgmorton Ave.
London EC 2, England

Automatic Control
430 Park Avenue
New York 22, New York

Banking
12 East 36th St.
New York 16, New York

Burroughs Clearing House
2nd and Burroughs Ave.
Detroit 32, Michigan

Business
Mercury House
109-119 Waterloo Rd.
London SE 1, England

The Computer Journal
The British Computer Society Ltd.
Finsbury Court, Finsbury Pavement
London EC 2, England

Computers and Automation
815 Washington St.
Newtonville 60, Mass.

Consulting Engineer
420 Main St.
St. Joseph, Michigan

Controllership Foundation, Inc.
Two Park Ave.
New York 16, New York

Electrical Engineering
33 West 39th Street
New York 18, New York

Electronics
330 West 42nd Street
New York 36, New York

Harvard Business Review
Soldiers Field Station
Boston 63, Mass.

Interscience Publishers Inc.
250 Fifth Ave.
New York 1, New York

N.A.A. Bulletin
505 Park Avenue
New York 22, New York

Navy Management Review
Supt. of Documents
U.S. Government Printing Office
Washington 25, D.C.

The Office
232 Madison Ave.
New York 16, New York

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4463 Penobscot Building
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440 Fourth Ave.
New York 16, New York

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